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September 12, 2000

Ms. Magalie Roman Salas, Secretary
Federal Communications Commission
The Portals, 445 12th Street, S.W.
Counter TW-A325
Washington, D.C. 20554

Re: ***Ex Parte* Submission of Northpoint Technology, Ltd.**
ET Docket No. 98-206, RM-9147, RM-9245

Dear Ms. Salas:

This letter is written to notify you that on September 12, 2000, Antoinette Cook Bush of Northpoint Technology, Ltd. and BroadwaveUSA, wrote to Harry Ng of the Commission's International Bureau, following up on questions that arose during a meeting on September 8, 2000. Attached to the letter, Ms. Bush included copies of items that had previously been filed in these proceedings.

An original and six copies of this letter and its attachments are submitted for inclusion in the public record for the above-captioned proceedings. Please direct any questions concerning this submission to the undersigned.

Sincerely,

David H. Pawlik
Counsel for Northpoint Technology, Ltd.
and BroadwaveUSA

BroadwaveUSA™
Creating Cable Competition with Northpoint Technology

400 North Capitol Street, NW, Suite 368
Washington, DC 20001

September 12, 2000

Mr. Harry Ng, Engineering Advisor
Satellite & Radiocommunications Division
International Bureau
Federal Communications Commission
445 Twelfth Street, SW, Room 7-A668
Washington, DC 20554

Dear Harry:

Enclosed please find a copy of Northpoint's letter to you of April 21, 2000 wherein we provide information about our 10-degree antenna pattern. Other sources for this information in the record can be found in our filings related to the handout at our presentation on the Northpoint EPFD limit on March 28, 2000 (filed March 30, 2000). Anticipating that this material may be filed away, we have also provided you another copy of this for your reference.

Sincerely,

Antoinette Cook Bush
Northpoint Technology, Ltd.

Cc: Don Abelson
Thomas Tycz
Karl Kensinger
Jennifer Gilsenan
Ira Keltz
Tom Derenge
Julius Knapp

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April 21, 2000

Magalie Roman Salas, Secretary
Federal Communications Commission
Counter TW-A325
The Portals, 445 12th Street, S.W.
Washington, D.C. 20554

Re: Ex Parte Submission of Northpoint Technology, Ltd.
ET Docket No. 98-206, RM-9147, RM-9245

Dear Ms. Salas:

In accordance with Section 1.206 of the Commission's rules, 47 CFR § 1.1206, this letter is written to notify you that Antoinette Cook Bush, Executive Vice President of Northpoint Technology, Ltd. ("Northpoint") spoke with Mr. Harry Ng of the International Bureau on Thursday, April 20, 2000. The issues discussed are summarized in the documents attached hereto.

An original and six copies of this letter and its enclosures are submitted for inclusion in the public record for the above-captioned proceedings. Please direct any questions concerning this submission to the undersigned.

Respectfully submitted,

Cheryl L. Hudson
Counsel for Northpoint Technology, Ltd.

cc: Ari Fitzgerald
Tom Derenge
Michael Marcus
Tom Stanley
Thomas Tycz
Michael Pollak
Julius Knapp
Julie Garcia
Kim Baum
James Burtle
Harry Ng

BroadwaveUSA™

Creating Cable Competition with Northpoint Technology

April 21, 2000

Mr. Harry Ng
International Bureau
Federal Communications Commission
The Portals, 445 12th Street, S.W.
Washington. D.C. 20554

Re: ET Docket No. 98-206, RM-147, RM-9245

Dear Mr. Ng:

With this letter I want to clarify some of the points made in Northpoint's March 30th *Ex-Parte* submission presentation. At that meeting we discussed Northpoint's deployment in different areas within the United States and the need to use a variety of techniques to accomplish our dual objectives of providing protection to DBS and high quality coverage to our customers. This range of deployment methods is typical of terrestrial systems. For this reason Northpoint has advocated a regulatory approach that specifies a required result, rather than a required method. For Northpoint this would mean a specific requirement for a minimum Carrier to Interference Ratio ("C/I ratio") over inhabitable areas, for example. Once this requirement was defined, it would be up to Northpoint to use whatever techniques it had available to accomplish this result.

The reason we believe that a minimum C/I over inhabitable areas is a good approach is that it provides 100% protection to all DBS customers now and in the future. Once a Northpoint deployment was in place and met the regulatory standard there would be no need for on going coordination with DBS (as new DBS customers are added) since 100% of all inhabitable areas would be protected. As described in our recent presentation, "uninhabited areas" would include bodies of water, national parks, quarries, cemeteries, roads and similar areas where habitation is not possible.

In our presentation Northpoint also showed two available antenna patterns, and provided examples of the type of sites where a particular pattern might be employed. Northpoint presented the C/I contours that would result from use of a particular antenna in the location described. The point of the presentation was to demonstrate how Northpoint could accomplish sufficient protection to DBS in all cases by using a variety of techniques. Northpoint did not intend to indicate that the two antenna patterns shown were all that were available, or that use of the specific antennas should be a requirement. These two antenna patterns that were provided in this presentation should be understood as representative examples only. (See Exhibit 1 for additional information.) They are by no means the only antenna patterns or mitigation techniques available to Northpoint. You may recall that in the meeting Saleem Tawil mentioned a new antenna design he is

developing and that may be available in the future. New technology, such as these developments from Mr. Tawil and others, may provide even greater flexibility in Northpoint deployments in the future.

Another mitigation technique available to Northpoint is shielding of the Northpoint transmitter, a technique that may be employed to assist with protection to DBS in certain cases. For example, during the Washington testing at Northpoint's Fort Lincoln location Northpoint demonstrated a simple shielding method that reduced near in C/I ratios by 5-10 dB. This result was presented to the FCC in Northpoint's November 12, 1999 *Ex Parte* filing and a copy of the relevant slide is attached as Exhibit 2 for your review.

As you can see from the above discussion, Northpoint has a wide range of techniques available to accomplish the dual goals of providing protection to DBS and high quality service to its customers. This is why we advocate a regulatory approach that specifies a result – in C/I ratios over inhabitable areas – rather than a method of accomplishing the result. We believe this approach guarantees protection to DBS, now and in the future, while giving Northpoint the option of using a full range of current and future technologies to accomplish these goals.

Should you have any other questions or need additional information, please do not hesitate to contact the undersigned.

Sincerely,

Antoinette Cook Bush
Northpoint Technology, Ltd

Cc: Ari Fitzgerald
Tom Derenge
Michael Marcus
Tom Stanley
Thomas Tycz
Michael Pollak
Julius Knapp
Julie Garcia
Kim Baum
James Burtle

Exhibit 1

Northpoint Antenna Pattern Information

In its recent presentation to the FCC, Northpoint described two antenna patterns. One was an antenna with 17 degree vertical beam width. This antenna was used in Northpoint's experimental program. Northpoint is also developing other transmit antennas, including antennas that will have a narrower vertical beam width. An example transmit antenna with a 10 degree vertical beam width was also described in the meeting. Both antenna patterns are depicted in Figure 1. The power flux density levels produced at the ground by the two antennas are depicted in Figure 2. The equations for these two antenna patterns are provided in Table 1.

Other antennas may be employed in different situations based upon the need for a particular pattern to achieve Northpoint's dual goal of providing protection to DBS and high quality service to its customers.

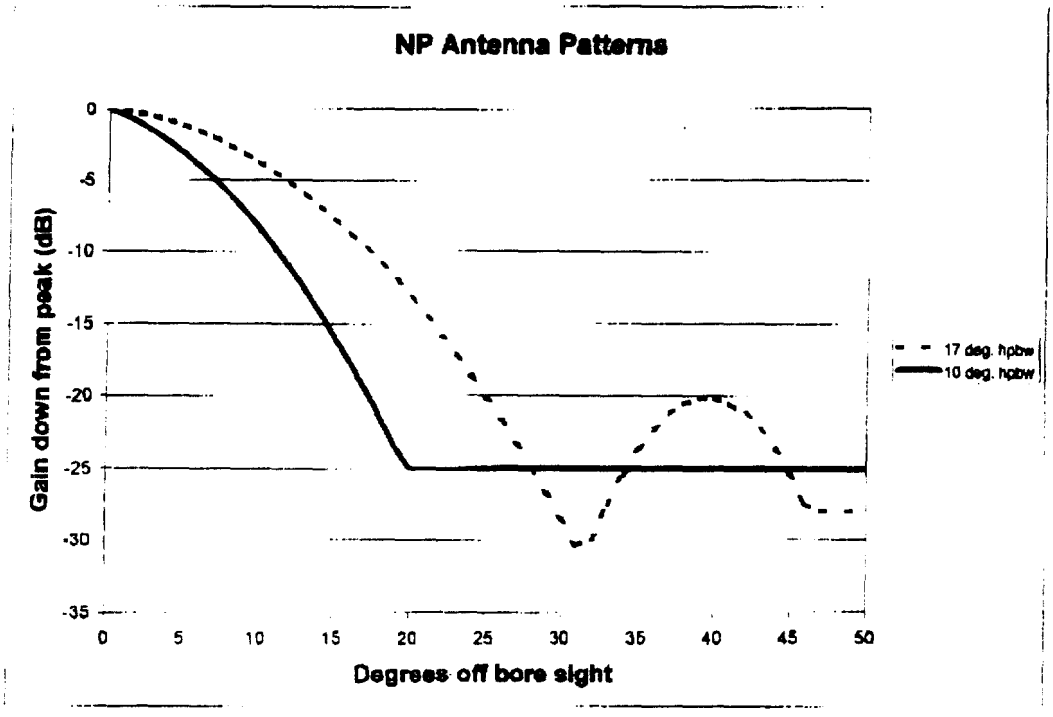


Figure 1. Sample Northpoint transmit antenna patterns.

Exhibit 1

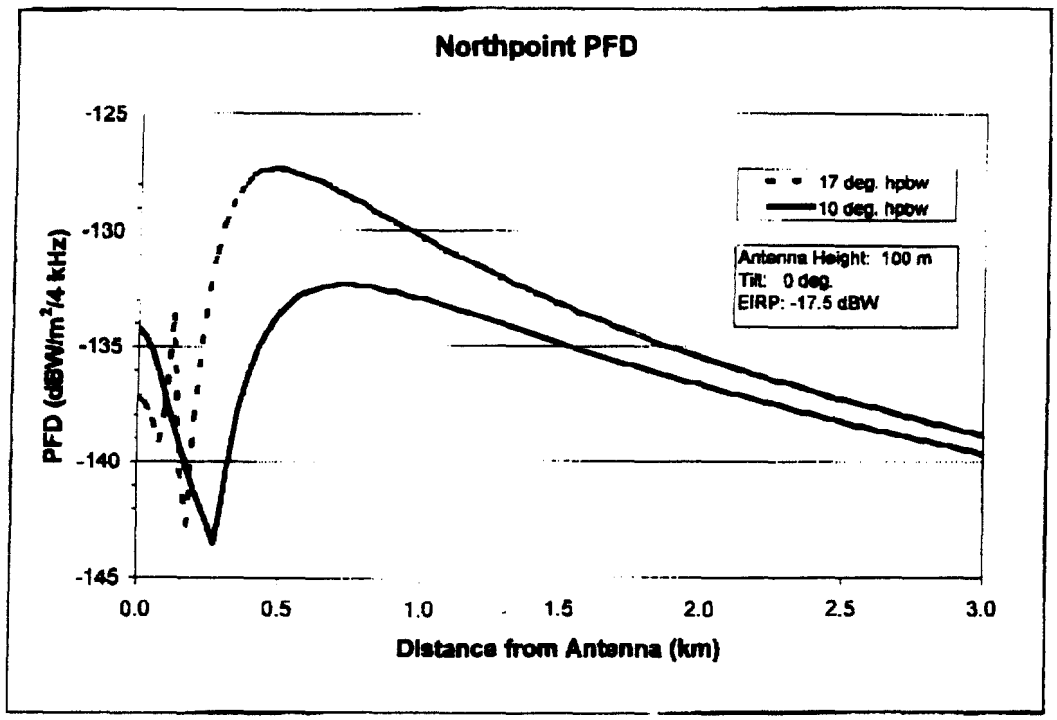


Figure 2. Comparison of power flux density levels with different transmit antenna patterns (calculated in accordance with p. 6 of exhibit C to Northpoint Technology Ltd. March 17, 2000 *Ex Parte* Submission).

Table 1. Sample Northpoint antenna patterns.

Pattern	Off bore sight angle	Gain (dB down from peak)
10 Degree Vertical*	$0 < \theta < 19.66$ $\theta > 19.66$	$G = -0.0448*\theta^2 - 0.3904*\theta$ $G = -25$
17 Degree Vertical	$0 < \theta < 31.6$ $31.6 < \theta < 46.2$ $\theta > 46.2$	$G = -0.029*\theta^2 - 0.08*\theta$ $G = -0.175*\theta^2 - 293.2 + 13.825*\theta$ $G = -28$

*Antenna gain envelope presented based on specification. Actual antenna performance is anticipated to exceed specification.

Exhibit 2

Highly Localized Mitigation Techniques Can Benefit Northpoint

- In our Washington field test, we successfully demonstrated near-in transmitter shielding as a mitigation method at both the USA Today and the Fort Lincoln site
- At Fort Lincoln the repeater was set back from the building face, in order to shield the ground near the transmitter, resulting in a 5-10 dB reduction in power level
- This significantly reduced the area within the 15 and 20 dB contours that had been forecast based on free space loss factors alone
- Techniques of this nature can completely eliminate the risk of harmful interference to all DBS households in the Northpoint service area

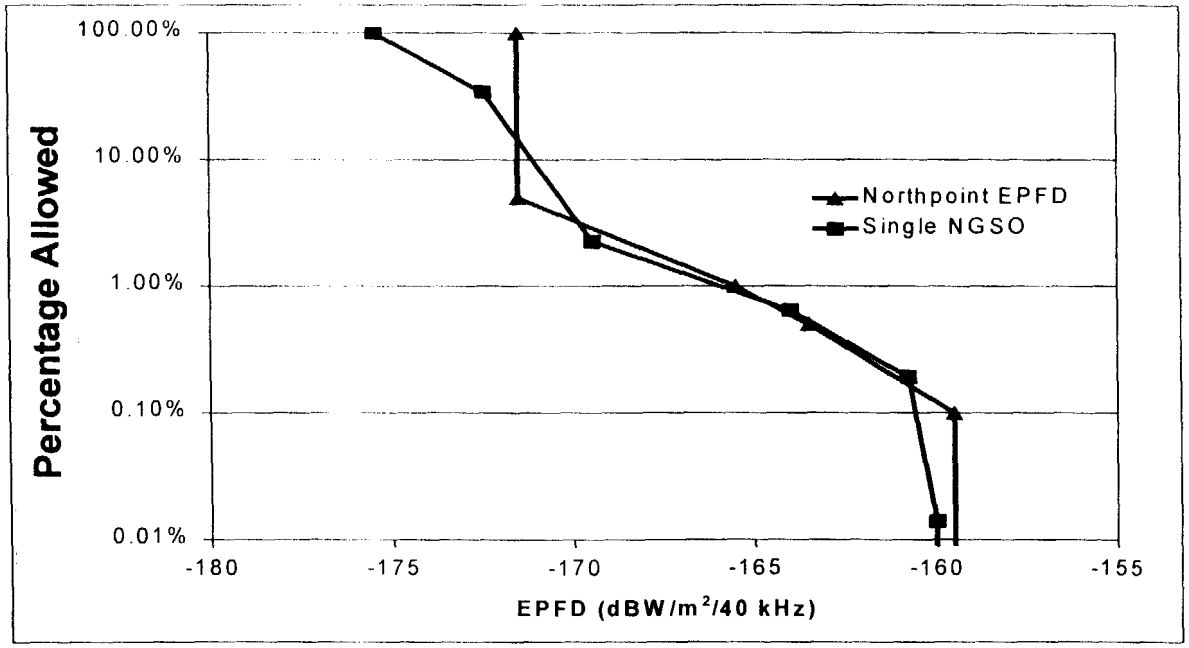
Developing a Northpoint EPFD Mask

- Goal:
  - Develop an Effective Power Flux Density ("EPFD") limit that will provide adequate protection to DBS while also allowing for a viable terrestrial service using Northpoint technology
- Facts:
  - Relevant work has already been done on the development of a NGSO - DBS sharing mask
  - DBS signal power varies 6 dB across the continental U.S. from –124.9 dBW/24 MHz in Seattle, Washington to –118.9 in Florida
  - Northpoint terrestrial installations can be individually engineered to meet local conditions

Comparison of the NGSO EPFD with the Northpoint EPFD

- Northpoint EPFD mask values are very similar to the NGSO FSS single entry EPFD mask

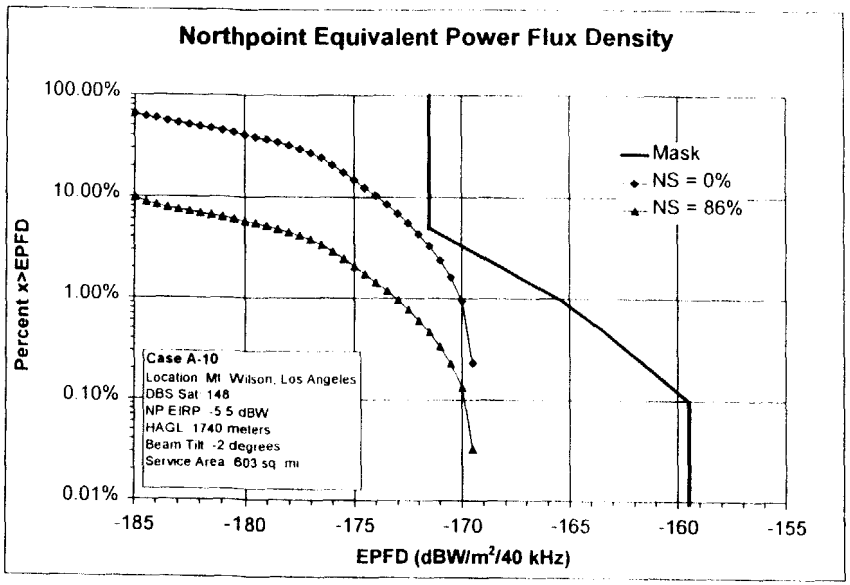
Values are for Seattle, Washington



Special Considerations for Uninhabited Areas

- The Northpoint EPFD limit is designed to provide a C/I ratio of 16 dB or higher to all homes in the inhabited areas of the United States
- In some cases Northpoint transmitters will be placed in *uninhabited* areas where the uninhabited area below the transmitter would have a theoretically lower C/I ratio if there were a DBS dish present
- In all such cases Northpoint sites will be engineered such that the Northpoint signal will be attenuated to the minimum EPFD limit by the time it reaches an inhabited area
- Northpoint proposes using a definition of "uninhabited" to include the physical real estate of the tower location, bodies of water, public lands and similar vacant areas

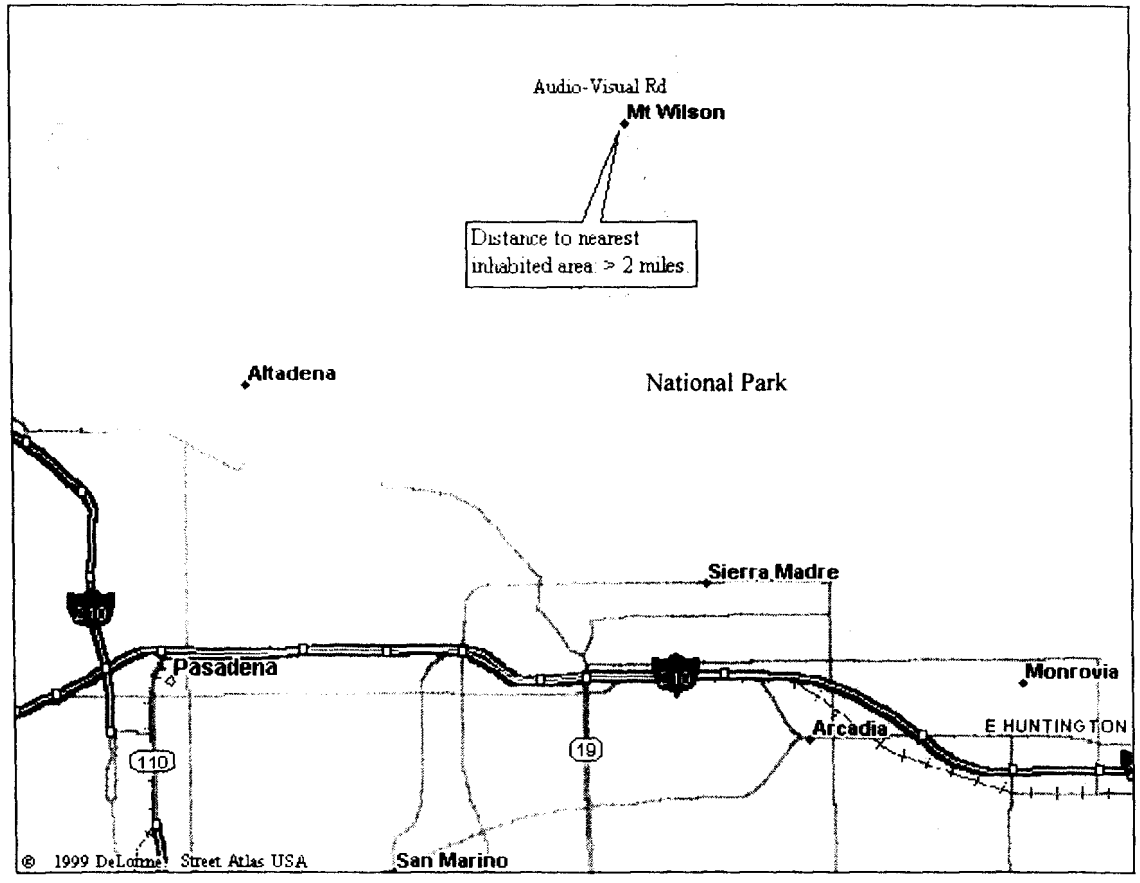
Example of Non-Typical Deployment



Mount Wilson in Los Angeles, CA

- Over 5000 feet above the Los Angeles Basin
- Used as a site for radio communication transmitters
- In the National Park over two miles from inhabited areas of Los Angeles
- Allows for service to a large area

Example Deployment: Mount Wilson Los Angeles, CA



The Northpoint EPFD Mask

March 28, 2000
Northpoint Technology

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March 30, 2000

Magalie Roman Salas
Secretary
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The Portals, 445 12th Street, S.W.
Washington, D.C. 20554

Re: Ex Parte Submission of Northpoint Technology, Ltd.
ET Docket No. 98-206, RM-9147, RM-9245

Dear Ms. Salas:

In accordance with Section 1.206 of the Commission's rules, 47 CFR § 1.1206, this letter is written to notify you that representatives of Northpoint Technology, Ltd. ("Northpoint") and Diversified Communications Engineering, Inc. ("DCE") met with members of the Commission staff on Tuesday, March 28, 2000. Present at the meeting were Sophia Collier, Katherine Reynolds, Linda Rickman, and Robert Combs of Northpoint and Saleem Tawil and Carmen Tawil of DCE. The members of the Commission staff who attended were from the Commission's Office of Engineering and Technology ("OET"), Wireless Telecommunications Bureau ("WTB") and International Bureau ("IB"). They are listed below.

In the meeting, Northpoint and DCE presented equivalent power flux density ("epfd") limits for implementation in conjunction with the proposed Northpoint system. Northpoint and DCE distributed a summary presentation as well as a detailed paper discussing the epfd limits to Commission staff members attending the meeting. Copies of these materials are submitted with this letter. Please note

Introduction

This paper documents the proposed Northpoint equivalent power flux density ("EPFD") limits presented to the Federal Communications Commission on March 28, 2000. The proposed EPFD takes the form of an EPFD mask that would be implemented on a local basis dependent upon DBS signal power, which is found to vary approximately 6 dB across the country.

The approach described here uses the proposed single entry NGSO-FSS EPFD limit as a model to identify initial carrier to interference ratios ("C/I ratios") values. These initial values are then modified to provide for the unique features of terrestrial services, which are not present in NGSO systems. In the proposed Northpoint EPFD mask, C/I ratios are expressed in terms of "percent of service area" rather than the "percent of time" used with the NGSO-FSS mask. Account is also taken of the varying DBS carrier power found across the United States, and an approach to adapting Northpoint's EPFD mask to the DBS carrier level is described. Finally, examples are provided for a range of power levels and deployment types demonstrating that the Northpoint EPFD mask is practical, providing both a high level of protection to DBS as well as a viable Northpoint service area.

Definition of EPFD Mask

To develop its mask Northpoint has begun with the standard definition of the equivalent power flux density for NGSO FSS as provided in the Report of Conference the Preparatory Meeting ("CPM") for WRC 2000:

$$EPFD = 10 \cdot \log_{10}\left[\sum_{i=1}^{N_a} 10^{\frac{P_i}{10}} \cdot \frac{G_t(\theta_i)}{4.\pi d_i^2} \cdot \frac{G_r(\phi_i)}{G_{r,\max}}\right]$$

where:

- N_a is the number of transmit stations in the non-geostationary-satellite system that are visible from the GSO receive station considered on the Earth's surface or in the geostationary orbit, as appropriate;
- i is the index of the transmit station considered in the non-geostationary-satellite system;
- P_i is the RF power at the input of the antenna of the transmit station, considered in the non-geostationary satellite system in dBW in the reference bandwidth;
- θ_i is the off-axis angle between the boresight of the transmit station considered in the non-geostationary satellite system and the direction of the GSO receive station;
- $G_t(\theta_i)$ is the transmit antenna gain (as a ratio) of the station considered in the non-geostationary satellite system in the direction of the GSO receive station;
- d_i is the distance in meters between the transmit station considered in the non-geostationary satellite system and the GSO receive station;

ϕ_i is the off-axis angle between the boresight of the antenna of the GSO receive station and the direction of the ith transmit station considered in the non-geostationary satellite system;

$G_r(\phi_i)$ is the receive antenna gain (as a ratio) of the GSO receive station in the direction of the ith transmit station considered in the non-geostationary satellite system;

$G_{r,max}$ is the maximum gain (as a ratio) of the antenna of the GSO receive station;

$EPFD$ is the computed equivalent power flux-density in dB(W/m^2) in the reference bandwidth.

Note that this equation is independent of both the carrier power, and the system noise. Recently, the CPM agreed to the following single entry mask for protection of the BSS in the 12.2 – 12.7 GHz band, as presented in the following table and graphically in the following figure:

Table 1. EPFD Mask for NGSO FSS in the band 12.2 – 12.7 GHz for BSS 45 cm Antenna.[1]

EPFD (dBW/m^2/40 kHz)	Single NGSO Percentage Allowed	Single NGSO Percentage Not to Exceed
-175.441	100.00%	0.00%
-172.441	34.00%	66.00%
-169.441	2.25%	97.75%
-164	0.64%	99.36%
-160.75	0.19%	99.81%
-160	0.01%	99.99%
-160	0.00%	100.0%

[1] CPM Report on technical, operational, and regulatory/procedural matters to be considered by the 2000 World Radiocommunication Conference, Annex 1 to Chapter 3.

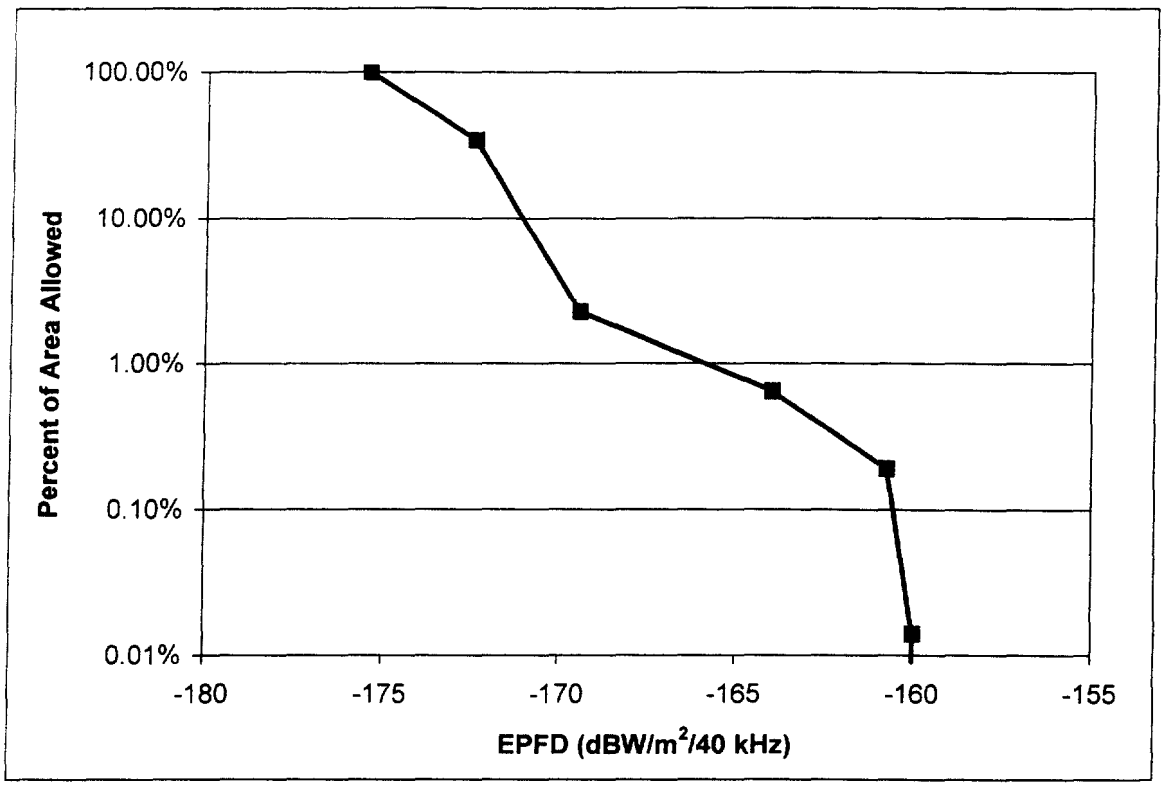


Figure 1. NGSO FSS EPFD for BSS in 12.2 - 12.7 GHz.

This NGSO FSS mask can be used as a model for preparing a Northpoint terrestrial mask. However, in the case of a Northpoint terrestrial mask, the ranges of allowable interference power would be expressed in terms of a percentage of service area, not the percent of time used in the NGSO FSS mask. Another significant difference that needs to be accounted for in a satellite EPFD mask vs.a terrestrial mask, is that interference from a satellite tends to be uniform across large area. It is therefore necessary for satellite EPFD masks to be designed such that the worst case is considered the general case. This is not necessary with terrestrial services like Northpoint. Terrestrial services such as Northpoint are individually engineered on a site-specific basis. Therefore "worst case" conditions can be addressed where they are actually found, and it is not necessary to generalize these conditions. The proposed EPFD mask described here can, therefore, be localized to account for the variance in DBS signal power across the United States. The benefit of this optimization is that the terrestrial services can operate at a higher power in areas where the DBS signal is higher and thus be more reliable, while still providing the same level of protection to DBS.

Determination of Northpoint EPFD Mask.

In the continental United States, the DBS carrier power varies from –124.9 to –118.9 dBW/24 MHz (for the low data rate links), depending on the area of the country. The lowest value occurs near Seattle, Washington. Assuming a required isolation for

performance objectives, the allowable EPFD mask can be calculated for Seattle, as per the following table:

Table 2. Calculation of Northpoint EPFD mask for Seattle, WA.

Percent of Area C/I not to be exceeded	100.0%	99.9%	99.5%	99.0%	95.0%	0.0%	
DBS Carrier Power	-124.9	-124.9	-124.9	-124.9	-124.9	-124.9	dBW/24 MHz
Allowable C/I	16	16	20	22	28	28	dB
Allowable Interference Power	-140.9	-140.9	-144.9	-146.9	-152.9	-152.9	dBW/24 MHz
Bandwidth Conversion	-27.8	-27.8	-27.8	-27.8	-27.8	-27.8	dB
Gain of 1 m2 antenna	43.2	43.2	43.2	43.2	43.2	43.2	$dB\text{-}m^2$
Peak antenna gain	34	34	34	34	34	34	dBi
EPFD	-159.5	-159.5	-163.5	-165.5	-171.5	-171.5	$dBW/m^2/40$ kHz

The following figure compares the Northpoint EPFD with the EPFD agreed to by CPM for a single NGSO satellite system.

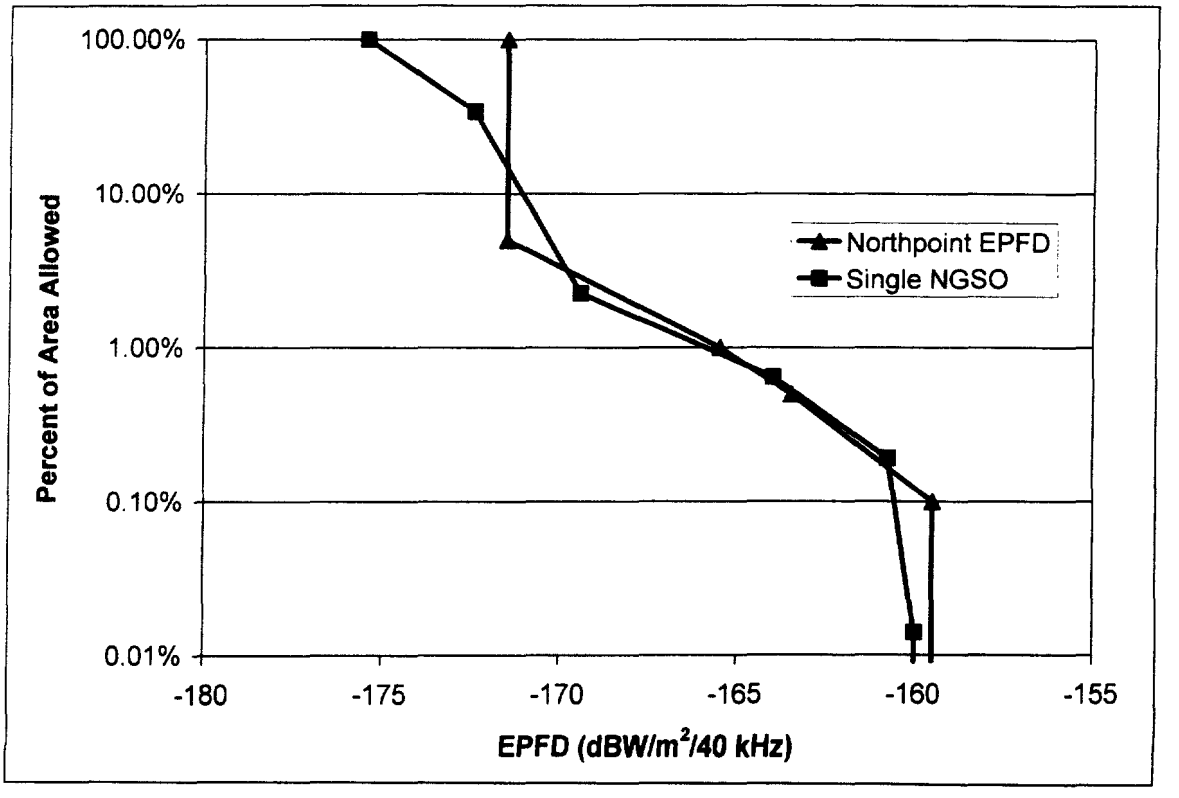


Figure 2. Comparison of Northpoint EPFD for Seattle, WA with NGSO FSS EPFD.

Similarly, for other parts of the country, the allowable interference masks are determined by the carrier power:

Table 3. Northpoint EPFD example masks (dBW/m^2/40 kHz).

DBS Carrier Power dBW/24MHz		**-124.9**	**-123.9**	**-122.9**	**-121.9**	**-120.9**	**-119.9**	**-118.9**
Percent of Area C/I not to be exceeded	C/I Ratio							
100	16	-159.5	-158.5	-157.5	-156.5	-155.5	-154.5	-153.5
99.9	16	-159.5	-158.5	-157.5	-156.5	-155.5	-154.5	-153.5
99.5	20	-163.5	-162.5	-161.5	-160.5	-159.5	-158.5	-157.5
99.0	22	-165.5	-164.5	-163.5	-162.5	-161.5	-160.5	-159.5
95.0	28	-171.5	-170.5	-169.5	-168.5	-167.5	-166.5	-165.5
0.0	28	-171.5	-170.5	-169.5	-168.5	-167.5	-166.5	-165.5

Each of the example masks represents a different part of the country where DBS EIRP varies according to contours. In order to identify the specific values to use for the mask in a particular location, measurement of the DBS signal would be made. These would then be confirmed by use of DBS contour maps filed with the FCC. Example masks for one dB increments are represented graphically in the following figure:

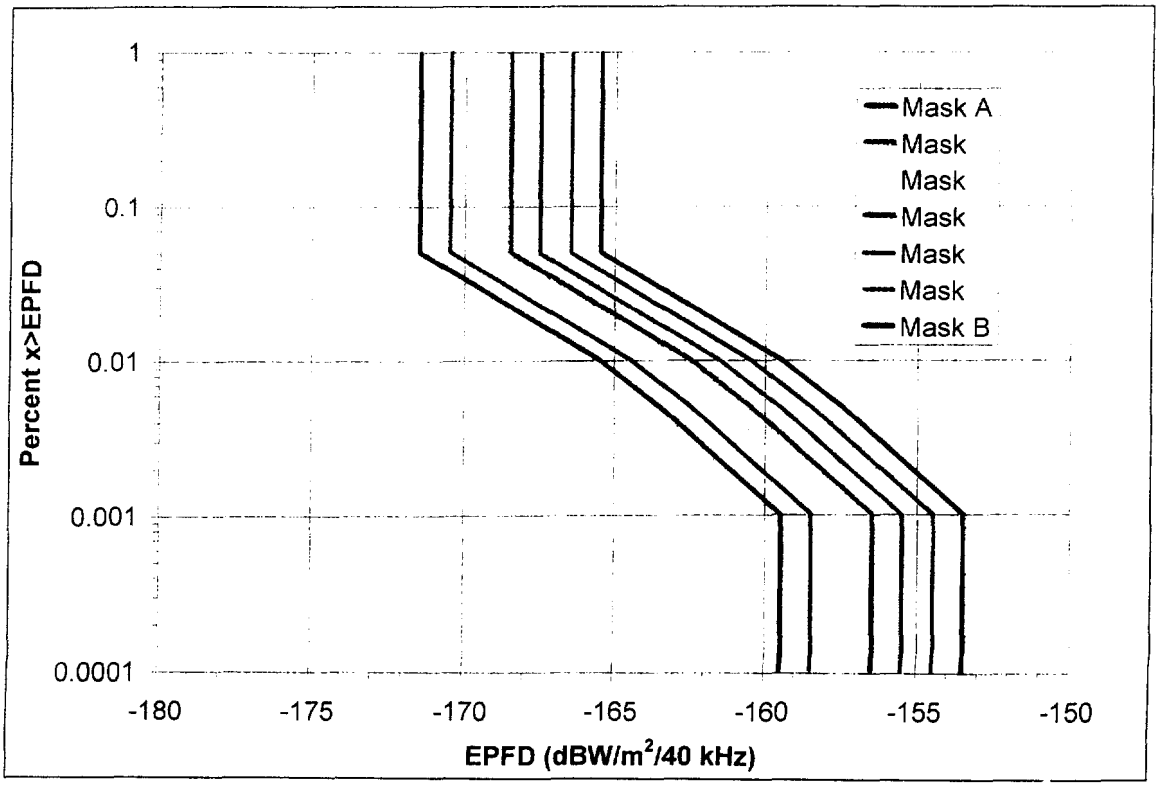


Figure 3. Various Northpoint EPFD masks throughout the United States.

In the attached appendices, representative Northpoint deployments are analyzed and compared with the EPFD masks for that area. The assumptions for the cases are summarized in the following table:

Table 4. Example Northpoint deployments in Seattle, WA.

Case	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	
DBS Satellite	148	119	101	148	119	101	148	119	101	West Longitude
Northpoint EIRP	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5	dBW/27 MHz
Northpoint Antenna Height	50	50	50	150	150	150	300	300	300	meters
Beam Tilt	5	5	5	0	0	0	0	0	0	degrees
Northpoint Service Area	56	56	56	90	90	90	92	92	92	Square Miles

Table 5. Example Northpoint deployments in Florida.

Case	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9	
DBS Satellite	119	101	61.5	119	101	61.5	119	101	61.5	West Longitude
Northpoint EIRP	-15	-15	-15	-14.5	-14.5	-14.5	-14.5	-14.5	-14.5	dBW/27 MHz
Northpoint Antenna Height	50	50	50	150	150	150	300	300	300	meters
Beam Tilt	3	3	3	0	0	0	0	0	0	degrees
Northpoint Service Area	64	64	64	90	90	90	92	92	92	Square Miles

Plotted on the figures are two sets of data, along with the EPFD mask. The data sets are for two different assumptions regarding the level of natural shielding (obstructions such as a structure, fence, or tree which afford DBS receive antennas protection from Northpoint interference). The first data set, labeled 'NS = 0%', assumes that there is no natural shielding. This is the most conservative assumption. The second data set is labeled 'NS = 86%', and this data assumes that 86% of DBS receive antennas have 15 dB of natural shielding,[2] which is the more realistic assumption.

Use of the Mask in Non-typical Deployments

As a terrestrial system, Northpoint will employ a wide variety of deployments, each of which will be individually engineered to meet the dual objectives of minimizing interference to DBS and providing high quality service to Northpoint's own customers.

In some cases, Northpoint will be deployed in a manner in which the Northpoint transmitter is located in an uninhabited area and operated at a higher power. However, in these cases the transmitter power will be set such that the Northpoint signal level is attenuated by free space loss to the point where it attains the power levels required by the

[2] This is the level of natural shielding found in a national survey of 400 DBS dish owners conducted by the survey firm of Bennett, Pettis and Blumenthal, submitted to the FCC in July 1999.

mask in inhabited areas. Thus, the mask will be valid over all inhabited areas where Northpoint is deployed.

The definition of uninhabited area will include the physical real estate of the transmitter location, bodies of water, vacant public lands, and similar areas where inhabitation is impossible or prohibited.

Mount Wilson in Los Angeles; An Example of a Non-Typical Deployment

Los Angeles is located in a large, primarily flat area, surrounded by mountains located in National Park lands. One such mountain, Mount Wilson, is used as a site for radio communications transmitters and potentially would be available for Northpoint. In this instance, the Northpoint transmitter would be located at a height of approximately 5000 feet and more than two miles into the park land. The combination of height and distance would provide significant attenuation at the nearest potential satellite receive location. Thus, an installation on Mount Wilson could operate at a power of –5.5 dBW and still be compliant with the mask.

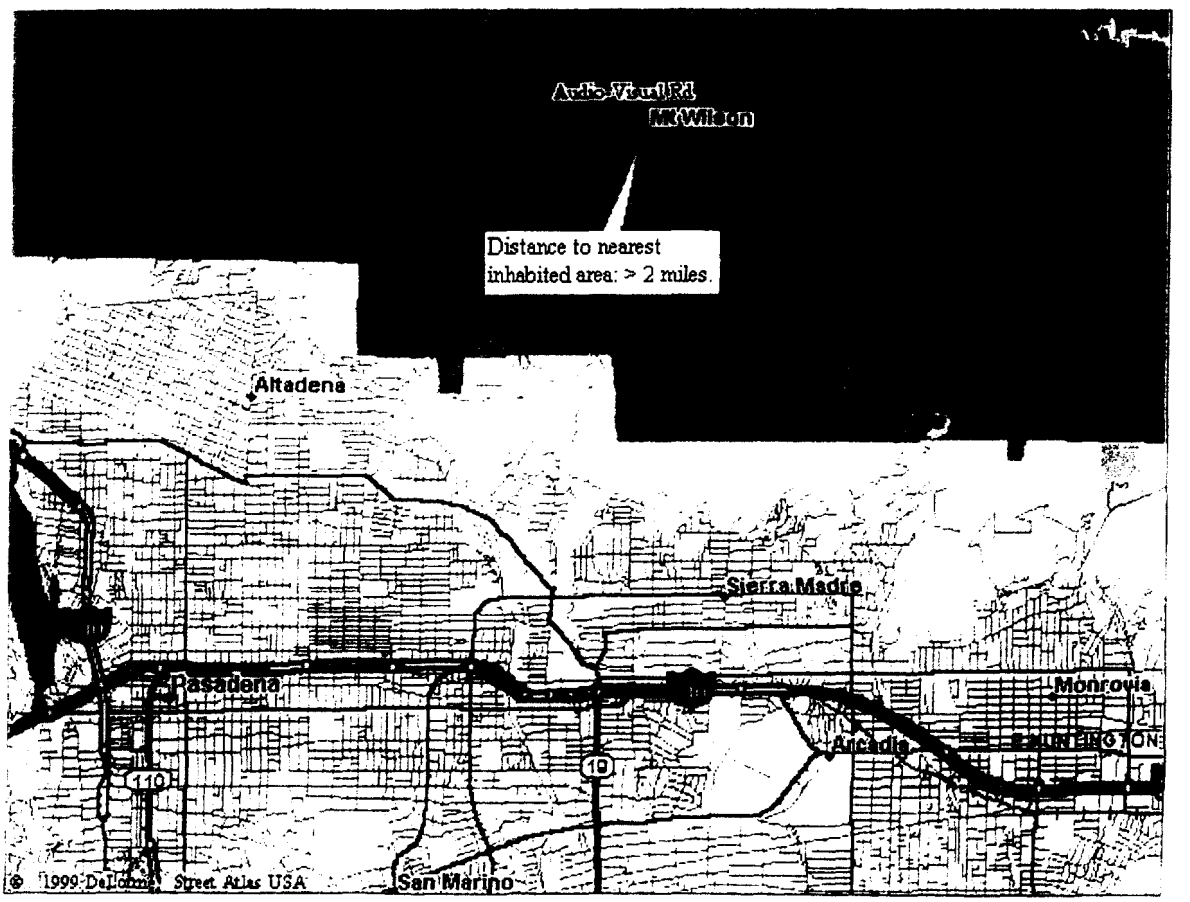


Figure 4. Map of Mt. Wilson and surrounding area.

Table 6. Example Northpoint deployment at Mt. Wilson, Los Angeles.

Case	A-10	A-11	A-12	
DBS Satellite	148	119	101	West Longitude
Northpoint EIRP	-5.5	-5.5	-5.5	dBW/27 MHz
Northpoint Antenna Height	1740	1740	1740	meters
Beam Tilt	-2	-2	-2	degrees
Northpoint Service Area	603	603	603	Square Miles

Summary

The EPFD mask presented in this paper is designed for the optimization of the dual goals of protection of DBS from harmful interference while at the same time allowing Northpoint, a significant new terrestrial service, to be deployed. The range of implementations of this mask were shown for a variety of Northpoint service areas including Florida where the DBS signal is strongest and Seattle, where it is weakest. Implementation of the mask in non-typical cases was also examined. In all cases, it was shown that application of the proposed mask would allow for protection of DBS to the same level as the single entry NGSO mask and that use of this mask would not inhibit the Northpoint system from universal deployment.

Appendix 1

This appendix contains the plots of example deployments in the Seattle, Washington area, and an example deployment of a higher-powered Northpoint transmitter located on Mt. Wilson, Los Angeles. The input assumptions are listed in Tables 1 and 2. Two types of figures are shown in this appendix.

- Plotted on the first figure are two sets of data, along with the EPFD mask. The data sets are for two different assumptions regarding the level of natural shielding (obstructions such as a structure, fence, or tree which afford DBS receive antennas protection from Northpoint interference). The first data set, labeled 'NS = 0%', assumes that there is no natural shielding. This is the most conservative assumption. The second data set is labeled 'NS = 86%', and this data assumes that 86% of DBS receive antennas have 15 dB of natural shielding.[1] This is the more realistic assumption.

- The second figure on each page shows, in an area near the Northpoint transmitter, the forecast equivalent power flux density, without any natural shielding.

Table 1. Example Northpoint deployments in Seattle, Washington.

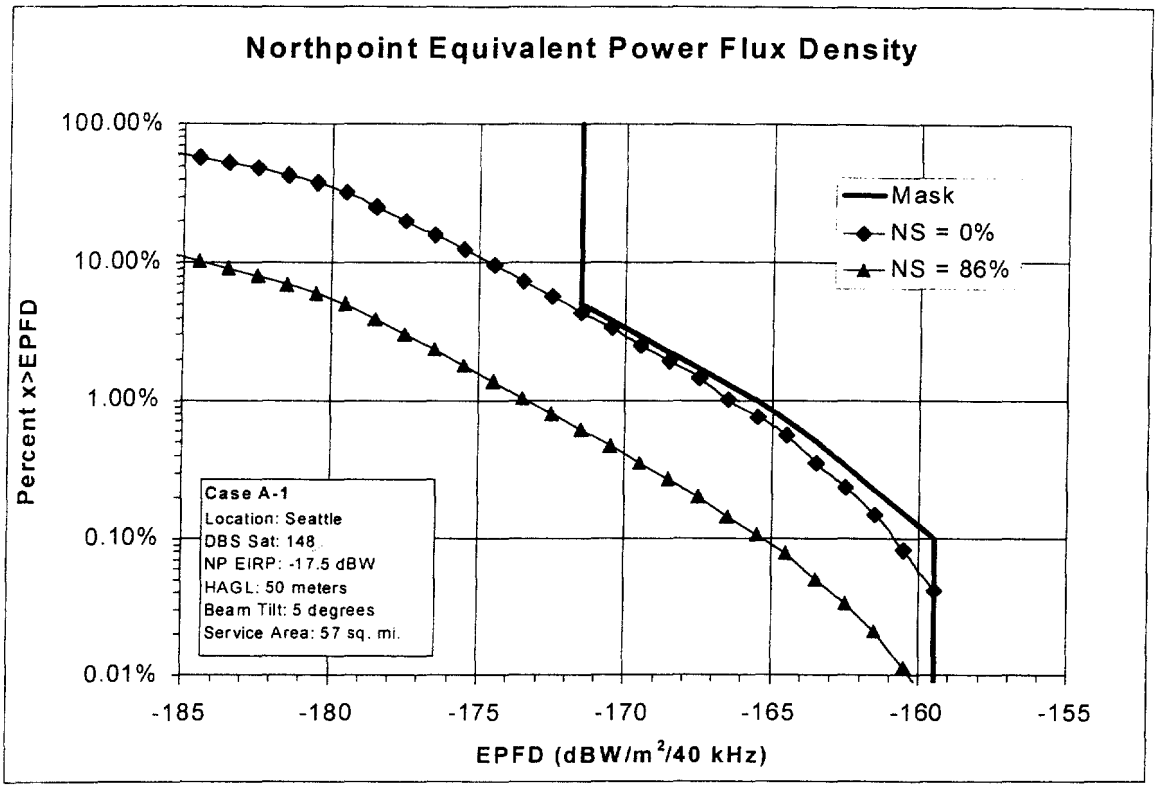
Case	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	
DBS Satellite	148	119	101	148	119	101	148	119	101	W. Longitude
Northpoint EIRP	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5	dBW/27 MHz
Northpoint Antenna Height	50	50	50	150	150	150	300	300	300	meters
Beam Tilt	5	5	5	0	0	0	0	0	0	degrees
Northpoint Service Area	56	56	56	90	90	90	92	92	92	Square Miles

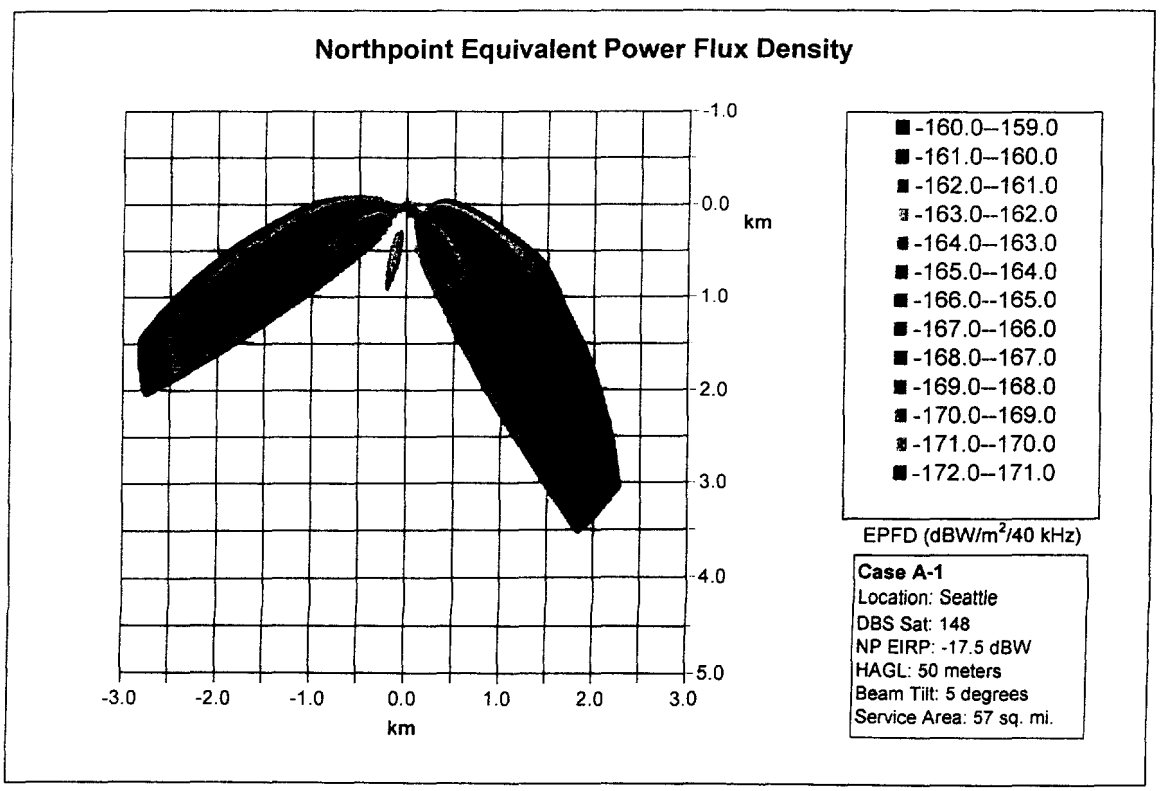
Table 2. Example Northpoint deployment at Mt. Wilson, Los Angeles.

Case	A-10	A-11	A-12	
DBS Satellite	148	119	101	West Longitude
Northpoint EIRP	-5.5	-5.5	-5.5	dBW/27 MHz
Northpoint Antenna Height	1740	1740	1740	meters
Beam Tilt	-2	-2	-2	degrees
Northpoint Service Area	603	603	603	Square Miles

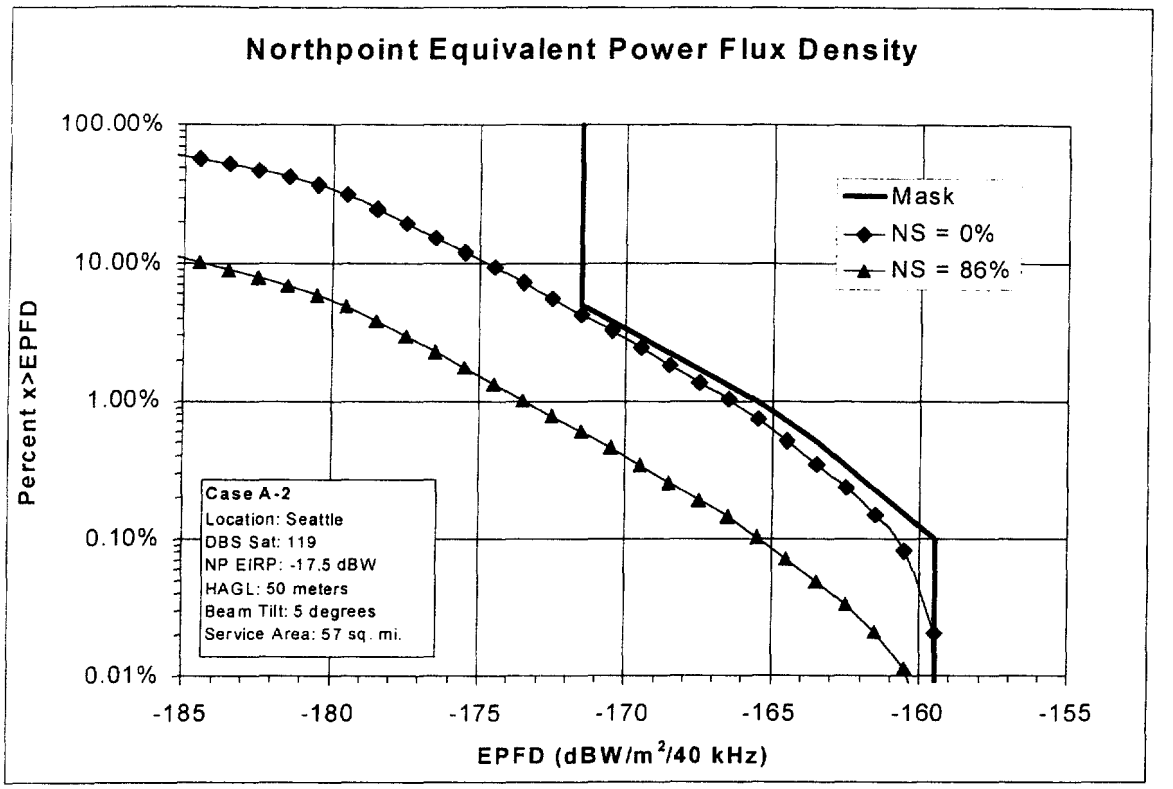
[1] This is the level of natural shielding found in a national survey of 400 DBS dish owners conducted by the survey firm of Bennett, Pettis and Blumenthal, submitted to the FCC in July 1999.

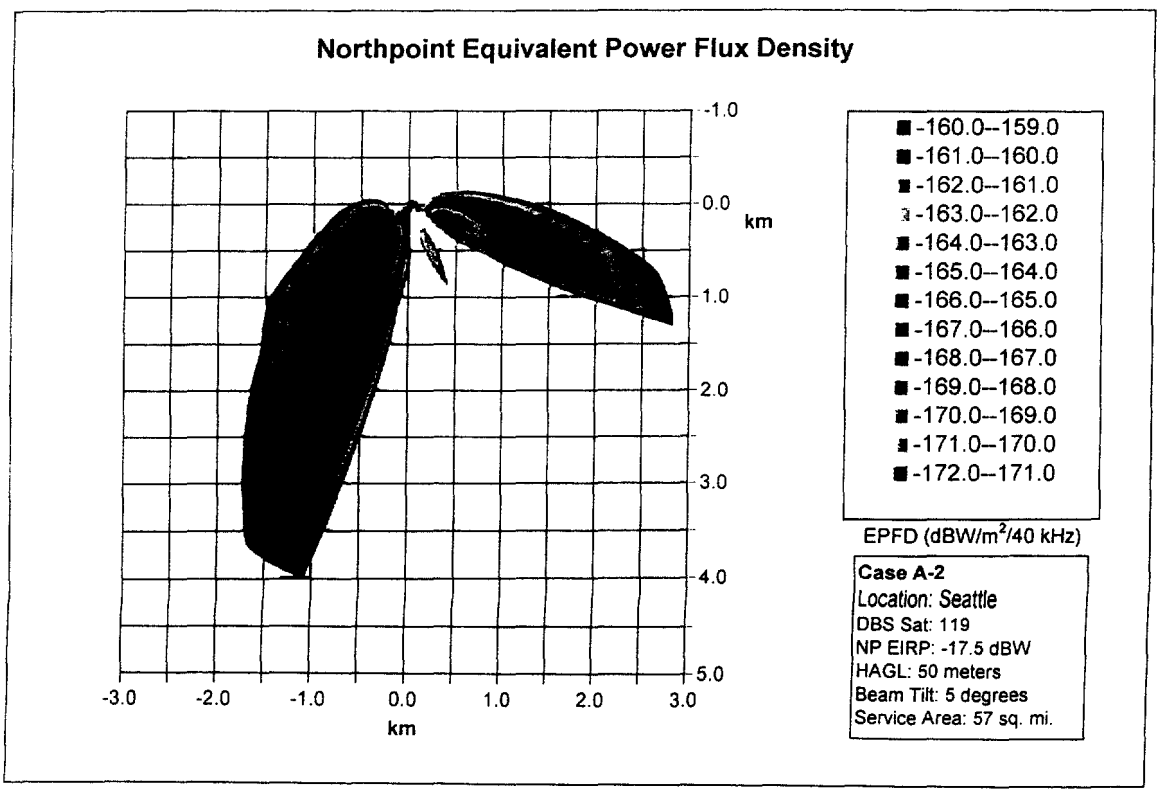
Appendix 1


Northpoint Equivalent Power Flux Density
100.00%
10.00%
1.00%
0.10%
0.01%
Percent x>EPFD
Mask
NS = 0%
NS = 86%
Case A-1
Location: Seattle
DBS Sat: 148
NP EIRP: -17.5 dBW
HAGL: 50 meters
Beam Tilt: 5 degrees
Service Area: 57 sq. mi.
-185
-180
-175
-170
-165
-160
-155
EPFD (dBW/m²/40 kHz)

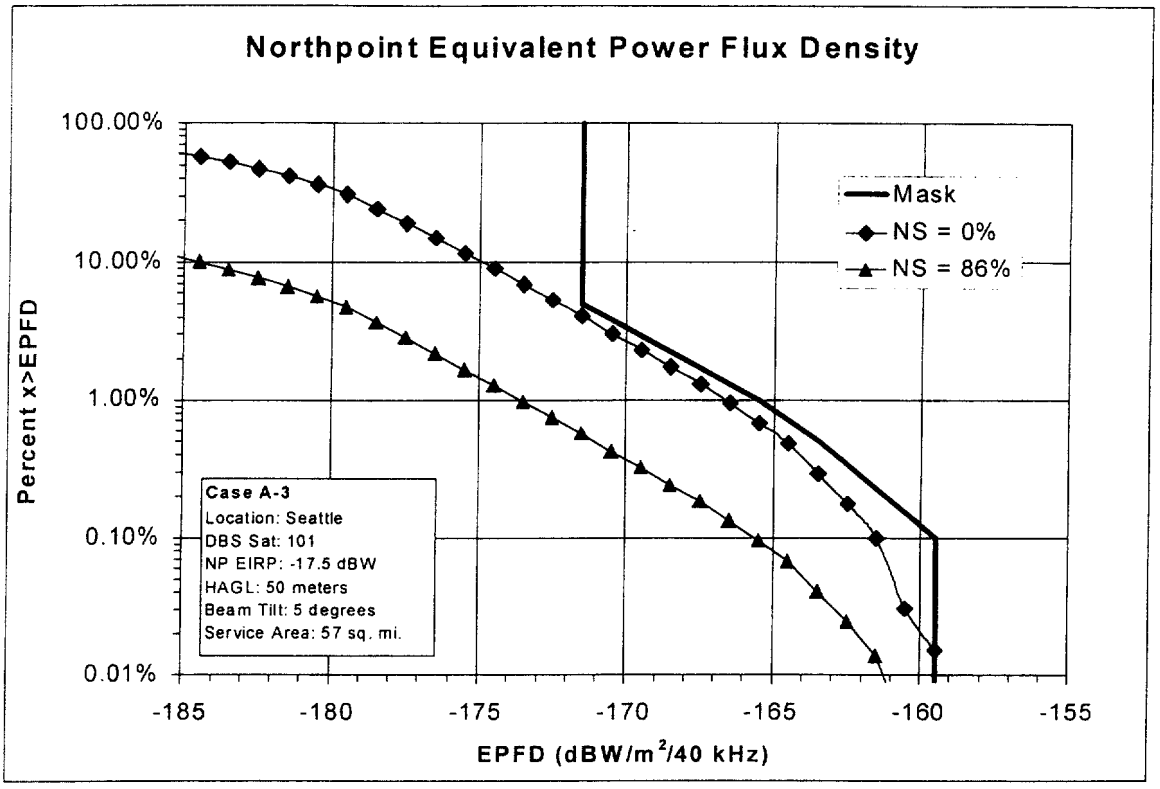

Northpoint Equivalent Power Flux Density
-1.0
0.0
1.0
2.0
3.0
4.0
5.0
km
-3.0
-2.0
-1.0
0.0
1.0
2.0
3.0
km
-160.0--159.0
-161.0--160.0
-162.0--161.0
-163.0--162.0
-164.0--163.0
-165.0--164.0
-166.0--165.0
-167.0--166.0
-168.0--167.0
-169.0--168.0
-170.0--169.0
-171.0--170.0
-172.0--171.0
EPFD (dBW/m²/40 kHz)
Case A-1
Location: Seattle
DBS Sat: 148
NP EIRP: -17.5 dBW
HAGL: 50 meters
Beam Tilt: 5 degrees
Service Area: 57 sq. mi.

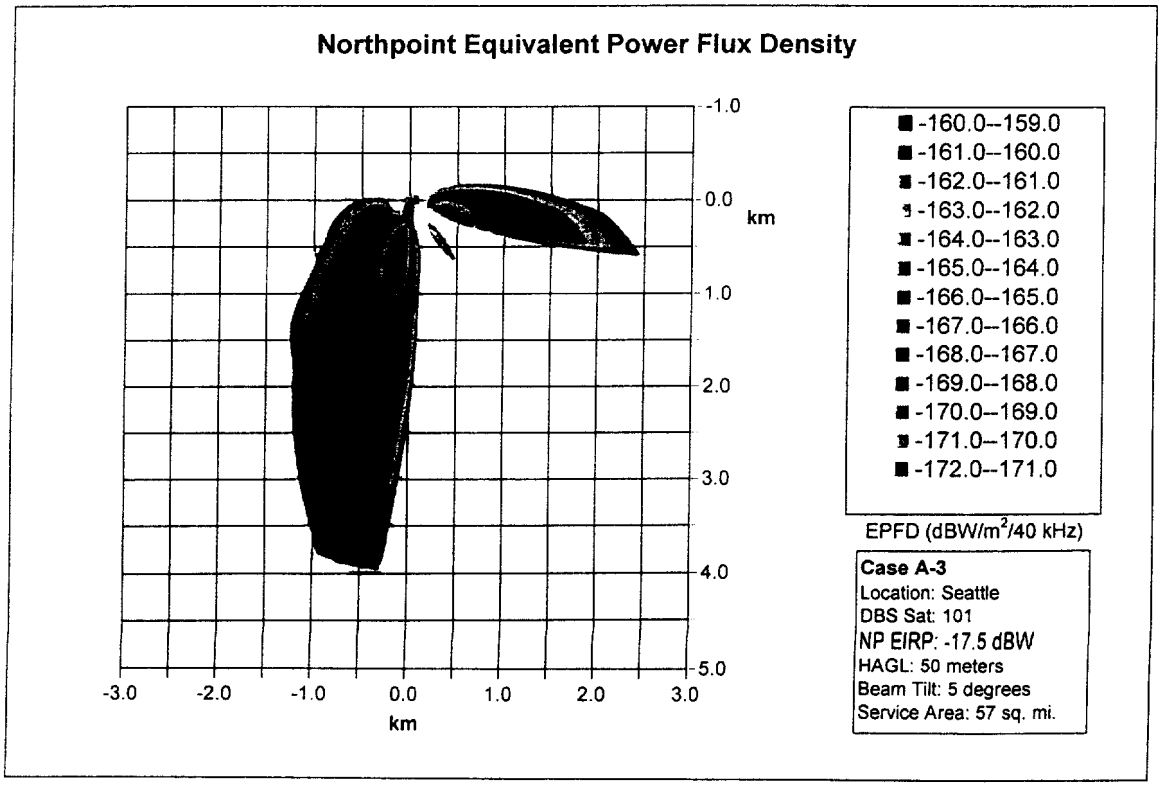
Appendix 1


Northpoint Equivalent Power Flux Density
100.00%
10.00%
1.00%
0.10%
0.01%
Percent x>EPFD
-185
-180
-175
-170
-165
-160
-155
EPFD (dBW/m²/40 kHz)
Mask
NS = 0%
NS = 86%
Case A-2
Location: Seattle
DBS Sat: 119
NP EIRP: -17.5 dBW
HAGL: 50 meters
Beam Tilt: 5 degrees
Service Area: 57 sq. mi.

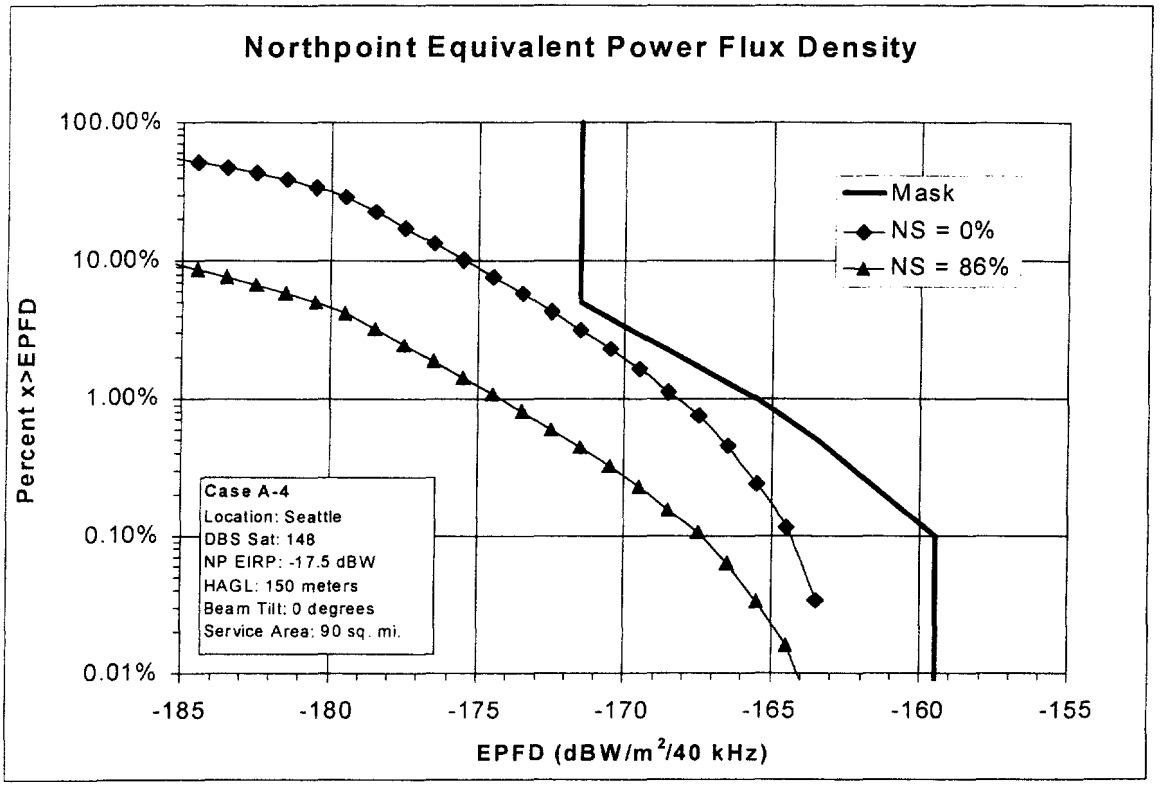

Northpoint Equivalent Power Flux Density
-1.0
0.0
1.0
2.0
3.0
4.0
5.0
km
-3.0
-2.0
-1.0
0.0
1.0
2.0
3.0
km
-160.0--159.0
-161.0--160.0
-162.0--161.0
-163.0--162.0
-164.0--163.0
-165.0--164.0
-166.0--165.0
-167.0--166.0
-168.0--167.0
-169.0--168.0
-170.0--169.0
-171.0--170.0
-172.0--171.0
EPFD (dBW/m²/40 kHz)
Case A-2
Location: Seattle
DBS Sat: 119
NP EIRP: -17.5 dBW
HAGL: 50 meters
Beam Tilt: 5 degrees
Service Area: 57 sq. mi.

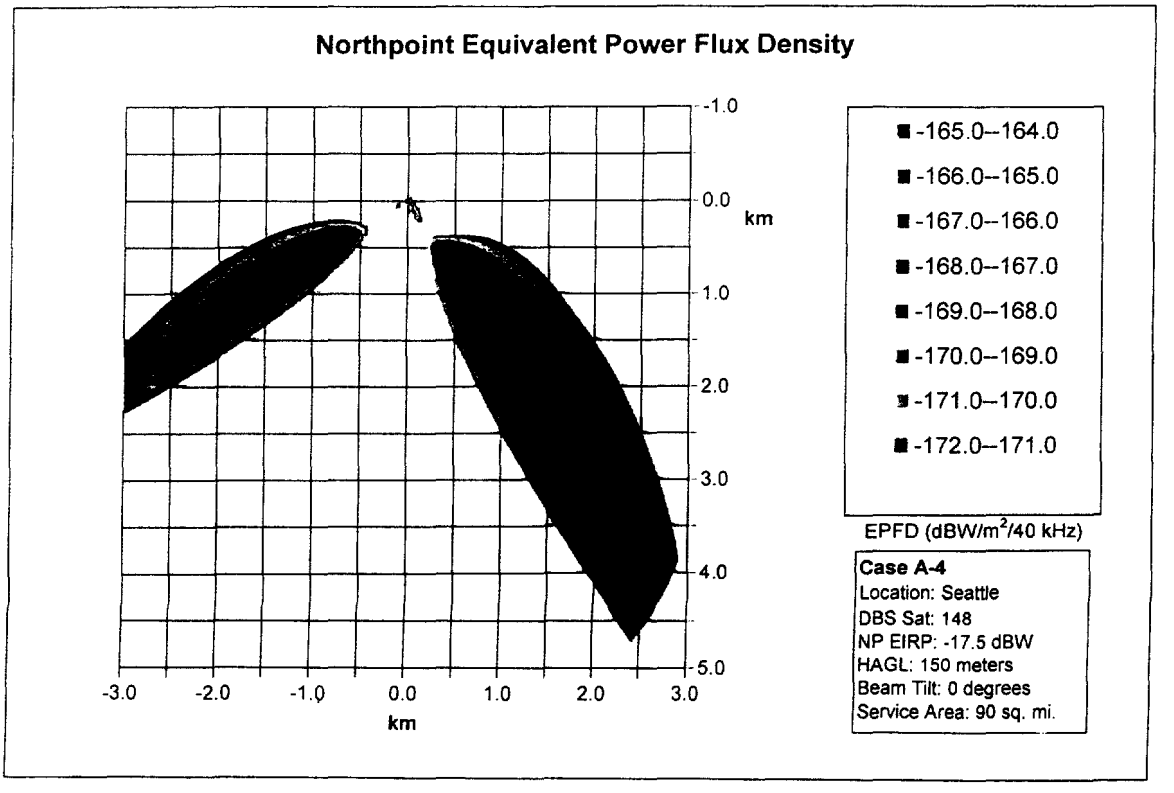
Appendix 1


Northpoint Equivalent Power Flux Density
100.00%
10.00%
1.00%
0.10%
0.01%
Percent x>EPFD
-185
-180
-175
-170
-165
-160
-155
EPFD (dBW/m²/40 kHz)
Mask
NS = 0%
NS = 86%
Case A-3
Location: Seattle
DBS Sat: 101
NP EIRP: -17.5 dBW
HAGL: 50 meters
Beam Tilt: 5 degrees
Service Area: 57 sq. mi.


Northpoint Equivalent Power Flux Density
-1.0
0.0
1.0
2.0
3.0
4.0
5.0
km
-3.0
-2.0
-1.0
0.0
1.0
2.0
3.0
km
-160.0--159.0
-161.0--160.0
-162.0--161.0
-163.0--162.0
-164.0--163.0
-165.0--164.0
-166.0--165.0
-167.0--166.0
-168.0--167.0
-169.0--168.0
-170.0--169.0
-171.0--170.0
-172.0--171.0
EPFD (dBW/m²/40 kHz)
Case A-3
Location: Seattle
DBS Sat: 101
NP EIRP: -17.5 dBW
HAGL: 50 meters
Beam Tilt: 5 degrees
Service Area: 57 sq. mi.

Appendix 1


Northpoint Equivalent Power Flux Density
100.00%
10.00%
1.00%
0.10%
0.01%
Percent x>EPFD
-185
-180
-175
-170
-165
-160
-155
EPFD (dBW/m²/40 kHz)
Mask
NS = 0%
NS = 86%
Case A-4
Location: Seattle
DBS Sat: 148
NP EIRP: -17.5 dBW
HAGL: 150 meters
Beam Tilt: 0 degrees
Service Area: 90 sq. mi.


Northpoint Equivalent Power Flux Density
-1.0
0.0
1.0
2.0
3.0
4.0
5.0
km
-3.0
-2.0
-1.0
0.0
1.0
2.0
3.0
km
-165.0--164.0
-166.0--165.0
-167.0--166.0
-168.0--167.0
-169.0--168.0
-170.0--169.0
-171.0--170.0
-172.0--171.0
EPFD (dBW/m²/40 kHz)
Case A-4
Location: Seattle
DBS Sat: 148
NP EIRP: -17.5 dBW
HAGL: 150 meters
Beam Tilt: 0 degrees
Service Area: 90 sq. mi.